a13 cmd.

system (13) generating a useful magnetic field and a stray magnetic field, a sound generating coil arranged in the useful field to associate with a diaphragm for generating an acoustic sound wave, and at least one movably mounted vibration generating coil (36, 37) arranged in the stray field area of the magnet system (13) for generating vibration perceptible by a user, the vibration generating coil (36, 37) being preferably also connected to a metal part (38) which consists of a soft-magnetic material.

REMARKS

This is responsive to the Office Action dated April 9, 2002, in which the Examiner rejects all the pending claims 1-9 as anticipated by Azima, et al. patents (U.S. Patent Nos. 6,151,402 and 6,192,136) under U.S.C. §102(e). The Examiner also objects the Specification and Abstract for some formality deficiencies. The applicants have amended the independent claims 1, 5 and 6 and added claims 10 – 20 to more clearly define the present invention, and have also amended the Specification and Abstract to overcome the formality deficiencies. No new matter is believed to have been introduced in the amendments. The applicants respectfully traverse the rejection of the Examiner based on the amended claims, as detailed below.

A brief explanation of the present invention is believed helpful in understanding the patentably distinguishing features of the present invention over the cited Azima patents. The present invention discloses a novel technique applicable in an electroacoustic transducer utilized in an apparatus such as a cell phone. In a conventional electroacoustic transducer, the same coil is utilized to realize two different functions – to generate, with the help of a diaphragm, acoustic sound signals that correspond to the phone messages, and to generate vibration perceptible by the user to alert him of an incoming call. This leads to a dilemma in designing the coil. On the one hand, the mass of the coil should be minimized so as to achieve a high-quality generation of sound

signals; and on the other hand, the mass of the coil should be maximized so as to achieve a maximal vibratory effect. To solve this problem, the present invention teaches to use different coils to realize these two different functions. In particular, as defined in the added independent claim 10, the sound generating means comprises a first coil to generate an acoustic sound wave, and the vibration generating means comprises one or more second coils to generate vibrations perceptible by the user. With the solution of the present invention, the coils can be selected independently from each other so as to achieve their respective goals.

Preferably, as defined in the amended independent claims 1, 6 and dependent claim 11, the second coils for generating perceptible vibration are arranged in a stray magnetic field generated by a magnet system, while the sound generating means (first coil) is arranged in the useful magnet field generated by the same magnet system.

The present invention is not anticipated by Azima. The Azima patents disclose a vibration transducer for causing a resonant radiator member to resonate, thus forming an acoustic radiator which provides an acoustic output when resonating (U.S. Patent No. 6,151,402, col. 2, lines 31-42). The coil or coils 13 in Figures 13 – 15 of the Azima patents are used for generating an acoustic sound wave with the help of the panel 2 (e.g., see col. 5, lines 52 – 55 of the Azima patent 6,151,402). In view of their functions, the coil 13 and panel 2 in Azima patents correspond to the sound generating means in the claims 1 and 6 of the present invention. In particular, the coil 13 in the Azima patents corresponds to the moving coil 26 of the present invention, while the panel 2 in the Azima patents corresponds to the diaphragm 28 of the present invention.

Azima never addresses or discusses the generation of a vibration perceptible by the user. Thus, there can be found nowhere in the Azima patents vibration generating means for generating vibration perceptible by a user, as defined in independent claims 1, 6 and 10, which is located in a different magnetic field from where the sound generating means is located. In particular, the Azima

patents do not teach or imply that a coil for generating perceptible vibration is provided separately from the sound generating means. Of course neither can it be found anywhere in the Azima patents that separate coils (first and second coils in Claim 10) are provided in the electroacoustic transducer to generate sound signal and perceptible vibration, respectively. Therefore, the applicants believe that the independent claims 1, 6 and 10 are not anticipated by the Azima patents, and are thus patentable.

At least for the same reasons, their independent claims are also patentable. In particular, the feature that a metal part is provided to be mechanically connected with the second coil (vibration generating coil) as defined in dependent claims 3, 8 and 12, which serves to increase the masses moved by the vibration coil, thus enhancing the perceptible vibration effect, cannot be found in the Azima patents.

The applicants therefore respectfully request for reconsideration in view of the above remarks and amendments. The Examiner is authorized to deduct additional fees believed due from our Deposit Account No. 11-0223.

Respectfully submitted,

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Dated: June 27, 2002

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal service as first class mail, in a postage prepaid envelope, addressed to Box Non-Fee Amendment, Commissioner for Patents, Washington, D.C. 20231 on June 27, 2002.

Dated June 26, 2002 Signed Paula M. Halsey Print Name Paula M. Halsey

MARKED-UP VERSION OF THE AMENDMENTS AND ADDED CLAIMS

IN THE SPECIFICATION:

Replace paragraphs 1 and 2 of page 1 (lines 1 – 4) with:

TECHNICAL FIELD

[The invention relates to an apparatus as defined in the opening part of claim 1.

The invention further relates to an electroacoustic transducer as defined in the opening part of claim 6.] The invention relates to an apparatus having an electroacoustic transducer, and further relates to an electroacoustic transducer.

Add a subtitle above paragraph 3 of page 1 (above line 6):

BACKGROUND AND SUMMARY OF THE INVENTION

Replace paragraph 3 of page 2 (lines 9-11) with the following:

According to the invention, in order to achieve the afore-mentioned object, [the characteristic features defined in the characterizing part of claim 1 are provided in an apparatus as defined in the opening part of claim 1] an apparatus having an electroacoustic transducer is provided, which transducer has a magnet system which generates a useful magnetic field in a useful field area and which generates a stray magnetic field in a stray field area, and which magnet system is used to realize vibration generating means for the generation of vibrations which are perceptible by a user of the apparatus, wherein the vibration generating means include, in addition to the magnet system of the transducer , at least one movably mounted vibration generating coil arranged in the area of the stray field generated by means of the magnet system of the transducer.

Replace paragraph 4 of page 2 (lines 12-14) with the following:

Furthermore, according to the invention, in order to achieve the afore-mentioned object, [the characteristic features defined in the characterizing part of claim 6 are provided in an electroacoustic transducer as defined in the opening part of claim 6] an electroacoustic transducer is provided, which has a magnet system which generates a useful magnetic field in a useful field area and which generates a stray magnetic field in a stray field area, and which magnet system is used to realize vibration generating means for the generation of vibrations which are perceptible by a user of the apparatus, wherein the vibration generating means include, in addition to the magnet system of the transducer, at least one movably mounted vibration generating coil arranged in the area of the stray field generated by means of the magnet system of the transducer.

Replace paragraph 6 of page 2 (lines 26 – 32) with the following:

In an apparatus in accordance with the invention and in an electroacoustic transducer in accordance with the invention the desired result can be achieved with only one vibration generating coil. However, it has proved to be very advantageous when, in addition, [the characteristic features defined in claim 2 and claim 7 are provided.] the vibration generating means include two movably mounted vibration generating coils arranged in the stray field area, and the two vibration generating coils are arranged in series opposition or in anti-parallel characteristic. In this way, it is achieved that the stray magnetic field of the magnet system, which field is oppositely poled at the two magnet ends (north pole and south pole), is utilized better and, as a result of this, a better vibratory effect is achieved.

Replace the last paragraph of page 2 (lines 33, page 2 – lines 7, page 3) with the following:

In an apparatus in accordance with the invention and an electroacoustic transducer in accordance with the invention it has proved to be particularly advantageous when, in addition,

[the characteristic features defined in claims 3 and 4 and claims 8 and 9 are provided.] the vibration generating means include, in addition to the at least one vibration generating coil, a metal part which is mechanically connected to the at least one vibration generating coil and which consists of a soft-magnetic material, and when the magnet system is basically ring-shaped, and the magnet system generates the stray magnetic field, which emanates from its outer peripheral area, and the at least one vibration generating coil is annular and is arranged to be coaxial with the axis of the magnet system and is mounted so as to be movable parallel to the axis of the magnet system. In this way, it is achieved that with the aid of the metal part of a soft magnetic material the stray magnetic field is enhanced as regards its direction and magnitude in the area in which the at least one vibration generating coil is disposed and, as a consequence, an improved vibratory effect is obtained. Furthermore, this solution has the advantage that the masses moved by means of the at least one vibration generating coil is increased substantially by the mass of the metal part, which is also advantageous for an optimum vibratory effect.

Replace paragraph 2 of page 3 (lines 8 – 12) with the following:

In an apparatus in accordance with the invention it has further proved to be advantageous when, in addition, [the characteristic features defined in claim 5 are provided.] an a.c. generator has been provided, which generator is adapted to generate an a.c. signal having a frequency of, preferably, between 50 Hz and 200 Hz, and the a.c. generator is connected to the at least one vibration generating coil in an electrically conductive manner and supplies the a.c. signal generated by it to the at least one vibration generating coil. This provides an embodiment having a vibration generating coil of a maximal diameter, which is advantageous in view of a simple construction and in view of an optimum vibratory effect.

Add a subtitle above paragraph 4 of page 3 (above line 17):

BRIEF DESCRIPTION OF THE DRAWINGS

Add a paragraph after paragraph 8 of page 3 (line 26):

Fig. 5 shows a circuit diagram of a circuit of the apparatus shown in Fig. 3.

Add a subtitle above the last paragraph of page 3 (above line 29):

DETAILED DESCRIPTION OF THE PREFEERED EMBODIMENT

Replace paragraph 2 of page 4 (lines 5 – 11) with the following:

The electroacoustic transducer 12 takes the form of a so-called loudspeaker capsule. The transducer 12 has a magnet system 13. The magnet system 13 consists of a ring-shaped magnet 14 on whose upper side an annular cover disc [14] 15 is disposed and on whose lower side an annular core disc 16 of a yoke 17 is disposed. The yoke 17 consists of the annular core disc 16 and of a hollow cylindrical yoke portion 18, whose end which is remote from the core disc 16 extends into the area of the cover disc 15, namely in such a manner that an annular air gap 19 is formed between the cover disc 15 and the yoke portion 18.

Replace the last paragraph of page 4 (line 32, page 4 – line 8, page 5) with the following:

Two coil connecting leads 19 lead away from the moving coil [19] 26. The first coil connecting lead 30 leads to a first moving coil terminal contact 32. The second coil connecting lead 31 leads to a second coil terminal contact 33. The two moving coil terminal contacts 32 and 33 take the form blade spring contacts which except for their bent free ends are covered with an insulating lacquer coating and are mechanically connected to the yoke 17. The bent free ends of the two

moving coil terminal contacts 32 and 33 engage against a printed circuit board 34 mounted in the apparatus 1 and having conductor tracks, which are not visible in Fig. 2, which conductor tracks lead to a sound signal source, not shown, by which the moving coil 26 can be driven with sound signals, in order to generate sound signals with the aid of the diaphragm 28, which sound signals correspond to a received telephone message.

Replace paragraph 2 of page 5 (lines 9 – 16) with the following:

In the area of the useful field, i.e. in the air gap 19, the magnet system 13 generates a useful magnetic field, in which the moving coil 26 is disposed, as a result of which acoustic sound waves can be produced in known manner by means of the moving coil 26 and the diaphragm 28. However, in a tray field area the magnet system [12] 13 also generates a stray magnetic field. In the present case, in which the magnet system 13 is basically ring-shaped, the magnet system 13 generates said stray magnetic field, which emanates from its outer circumferential area and which passes freely through the hollow cylindrical portion 20 of the plastic transducer housing 21.

IN THE CLAIMS:

1. (Amended) An apparatus having an electroacoustic transducer, [which has] said transducer comprising: a magnet system which generates a useful magnetic field in a useful field area and [which generates] a stray magnetic field in a stray field area, sound generating means arranged in said useful magnetic field for generating acoustic sound wave, and [which magnet system is used to realize] vibration generating means for [the generation of] generating vibrations [which are] perceptible by a user of the apparatus, wherein the vibration generating means [include, in addition to the magnet system of the transducer,] comprises at least one movably

mounted vibration generating coil arranged in the [area of] the stray magnetic field generated [by means of the magnet system of the transducer].

5. (Amended) An apparatus as claimed in claim 1, [wherein] further comprising an a.c. generator [has been provided, which generator is] adapted to generate an a.c. signal having a frequency of, preferably, between 50 Hz and 200 Hz, and the a.c. generator is connected to the at least one vibration generating coil in an electrically conductive manner and supplies the a.c. signal generated by it to the at least one vibration generating coil.

6. (Amended) An electroacoustic transducer, comprising [which has] a magnet system which generates a useful magnetic field in a useful field area and [which generates] a stray magnetic field in a stray field area, sound generating means arranged in said useful magnetic field for generating acoustic sound wave, and [which magnet system is used to realize] vibration generating means for [the generation of] generating vibrations [which are] perceptible by a user of the apparatus, wherein the vibration generating means [include, in addition to the magnet system of the transducer,] comprises at least one movably mounted vibration generating coil arranged in the [area of] the stray magnetic field [generated by means of the magnet system of the transducer].

10. (New) An electroacoustic transducer, comprising:

magnet system for generating a magnetic field;

sound generating means for generating acoustic sound wave, said sound generating means comprising a first coil placed in said magnetic field; and

vibration means for generating vibration perceptible by an user, said vibration means comprising one or more second coils placed in said magnetic field.

11. (New) The electroacoustic transducer of claim 10 wherein said magnetic field comprises a useful magnetic field and a stray magnetic field, and wherein said first coil is located in said useful magnetic field, while said one or more second coils are located in said stray magnetic field.

12. (New) The electroacoustic transducer of claim 11 wherein said vibration means further comprises a metal part mechanically connected to said one or more second coils.

13. (New) The electroacoustic transducer of claim 12 wherein said metal part consists of a soft-magnetic material.

14. (New) The electroacoustic transducer of claim 11 wherein said magnet system comprises a magnet of ring-shaped having an inner peripheral area and an outer peripheral area.

15. (New) The electroacoustic transducer of claim 14 wherein said useful magnetic field is located at said inner peripheral area while said stray magnetic field is located at said outer peripheral area.

16. (New) The electroacoustic transducer of claim 15 wherein said one or more second coils are arranged at said outer peripheral area and coaxially with said magnet.

17. (New) The electroacoustic transducer of claim 16 wherein said one or more second coils are mounted to be movable parallel to an axis of said magnet.

18. (New) The electroacoustic transducer of claim 11 wherein said sound generating means further comprises a diaphragm activated by said first coil to produce said acoustic sound wave.

19. (New) The electroacoustic transducer of claim 6 wherein said sound generating means comprises a coil and a diaphragm activated by said coil for generating said acoustic sound wave.

20. (New) The apparatus of claim 1 wherein said sound generating means comprises a coil and a diaphragm activated by said coil for generating said acoustic sound wave.

IN THE ABSTRACT:

Replace paragraph with the following:

In an apparatus (1) having an electroacoustic transducer (12) which includes a magnet system (13) generating a useful magnetic field and a stray magnetic field, a sound generating coil arranged in the useful field to associate with a diaphragm for generating an acoustic sound wave, [which is used to realize vibration generating means (35) the vibration generating means (35) include, in addition to the magnet system (13),] and at least one movably mounted vibration generating coil (36, 37) arranged in the stray field area of the magnet system (13) for generating vibration perceptible by a user, the vibration generating coil (36, 37) being preferably also connected to a metal part (38) which consists of a soft-magnetic material.

[(Fig. 2).]